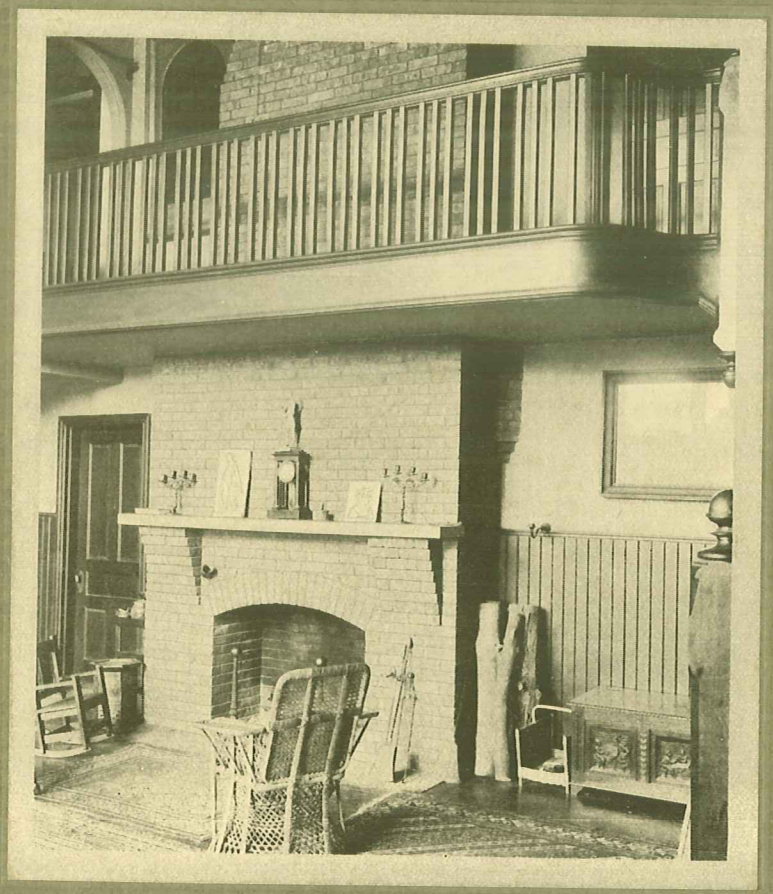
The HEART *of the* HOME



The Common Brick Manufacturers' Association of America

Cleveland, Ohio

BALTIMORE BRICK CO.
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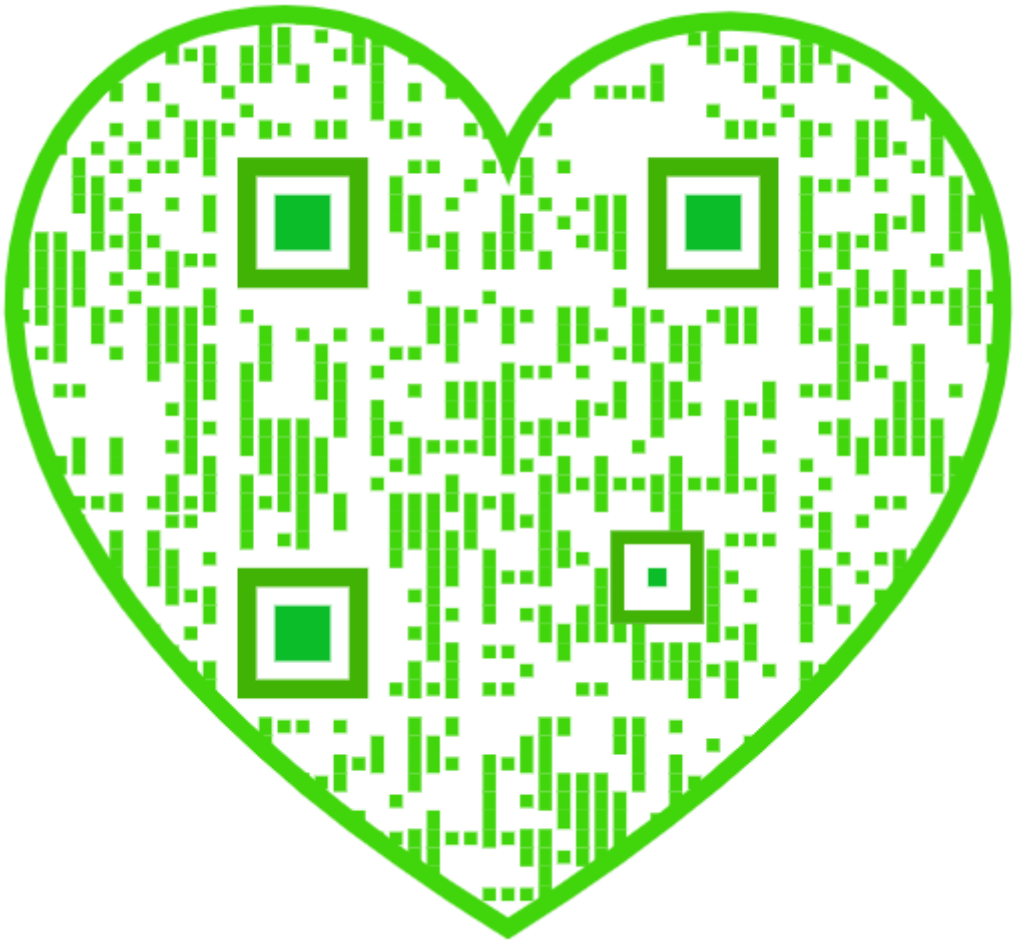
BALTIMORE, MD.



THE HEART OF THE HOME

FIREPLACE DESIGNS

How to Build Them

BALTIMORE BRICK CO.
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BALTIMORE, MD.

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2121 Guarantee Title Building , Cleveland

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Wide Mortar Joints accentuate the pattern

The Heart of the Home
The Fireplace

BEFORE we undertake the rather prosaic but important task of learning how to correctly build a fireplace, may we not indulge ourselves and our imagination for a few brief moments? Let us look at a few of those fireplaces which are now adding their full measure of grace, beauty, charm and comfort to the homes and lives of others. Perhaps we may then indulge ourselves a bit further and build our own dream fireplace, which later may become a reality and so add its quota of joy to our lives and to the lives of those who care enough for us to come and sit by our fireside.

When primitive man discovered how to make a fire, it at once became the gathering place for the family; it supplied warmth and was a potent protection against the devouring animals; it furnished the heat for cooking food; it was the one and only essential of the home, for the family gathering place was really *home* even though the gathering was not sheltered by a *house*.

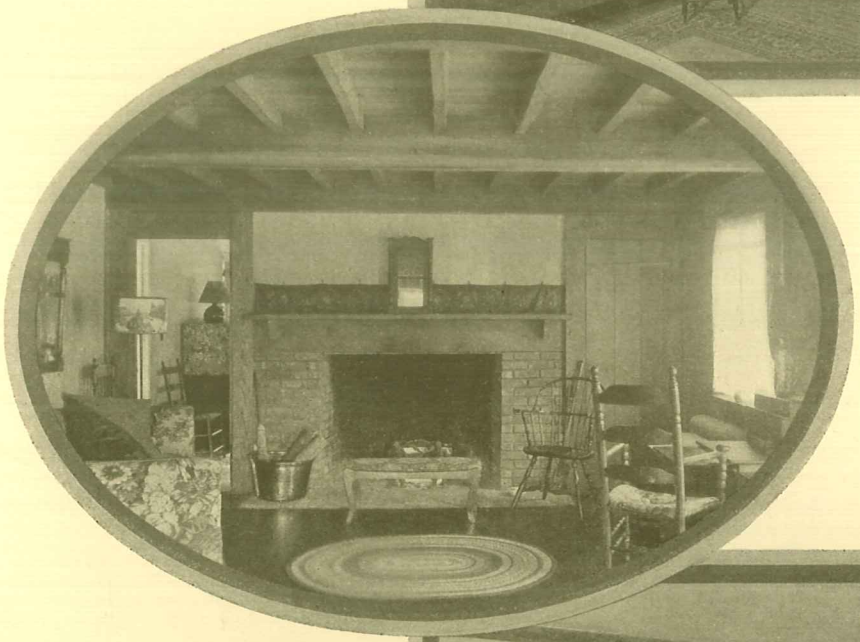
As civilization progressed, the fireside, and later the fireplace, ever held its place as a source of man's necessities and comforts and joys.

It is only since the inventions of modern times have given us such things as hot-water heat, vapor heat, washed and humidified and ionized air, and the other conveniences of our complex and hectic life, that the fireplace has become a luxury instead of a necessity. But we are again learning that it possesses certain virtues which mean much to our cultural development, and to family affection and to a kindly regard for others. We are finding out that the absence of a fireplace in the home is in reality a lack of something essential to our well-being and greatest happiness. We are becoming so impressed, unconsciously perhaps, that we now supply our homes with several fireplaces, if our plans and purses permit.

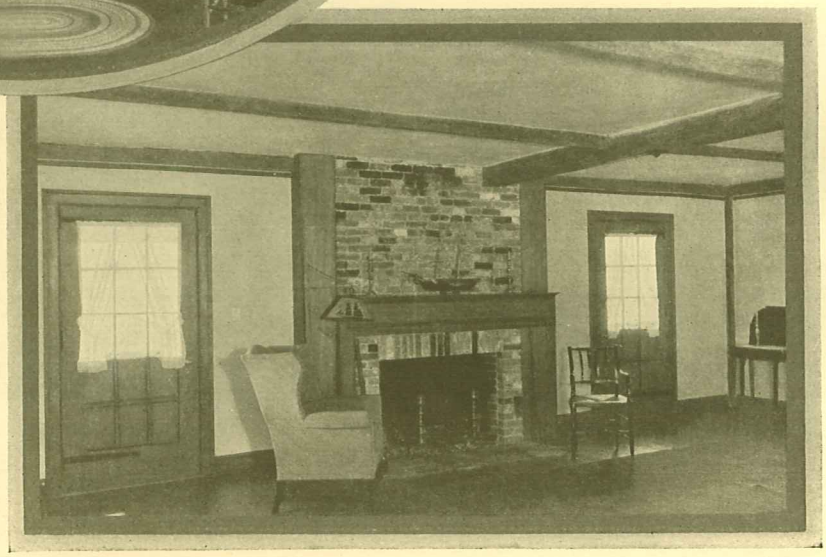
And so we are returning to a state of mind where our best thought and artistic fancy are employed in the design and ornamentation of this veritable "heart of the home."

You may find pleasure and inspiration in these few examples of fireplaces selected for you to look at. And may

Built-in old-fashioned oven



In harmony with exposed timbers



Vari-colored brick add new interest

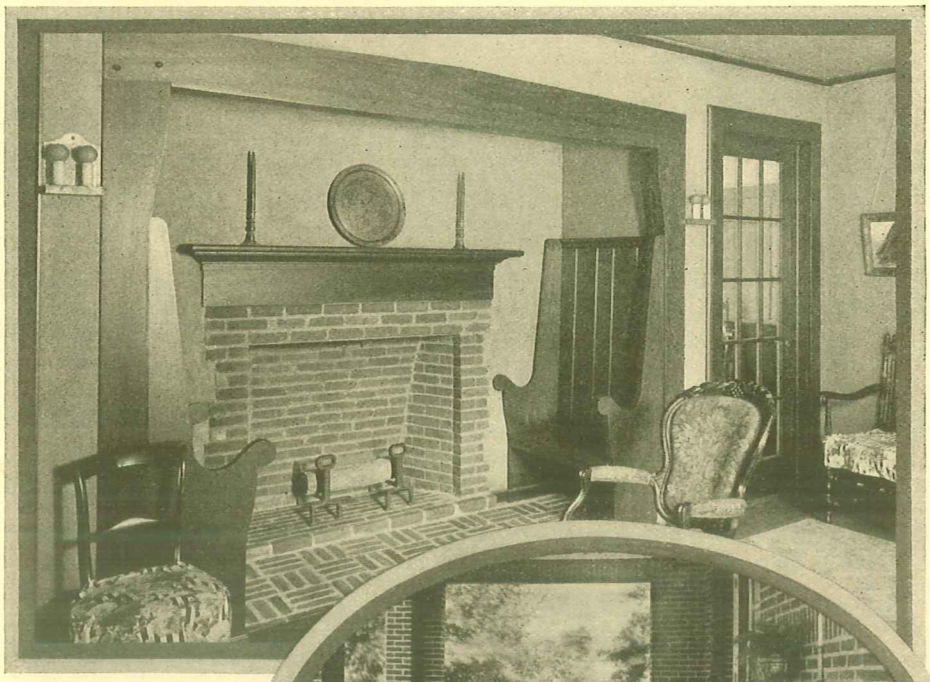
we remind you that while the high fire-resistiveness of well-burned common brick makes it the specified material for the chimney and the greater part of all fireplaces, the colors and textures of common brick permit it to grace the front and breast of fireplace and mantel in a manner admired by all and used by even the most fastidious.

The fireplace is very properly a part of the furnishing of a room—a built-in feature. It should conform to the dominant architectural style and period.

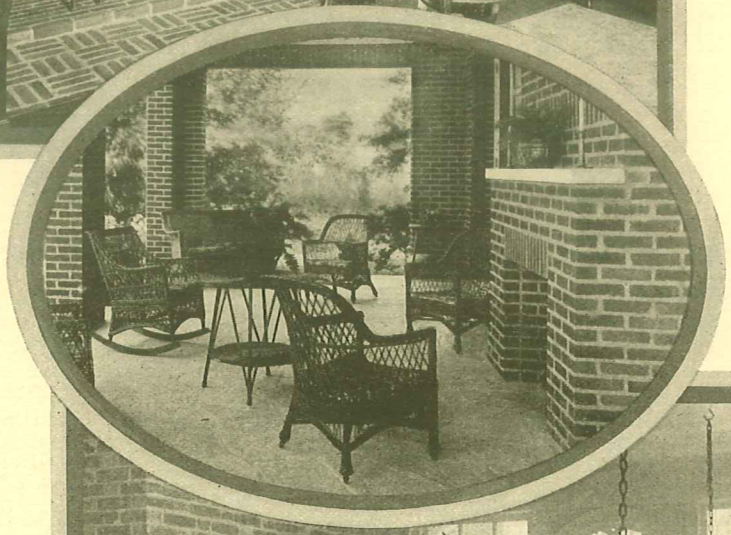
The natural surfaces of common brick, the slight irregularities and the wide variety of shadings makes this material particularly "flexible" and adaptable in the hands of the architect. And these same native textures and tones make common brick most appropriate for interior decoration.

The Common Brick Manufacturers' Association of America

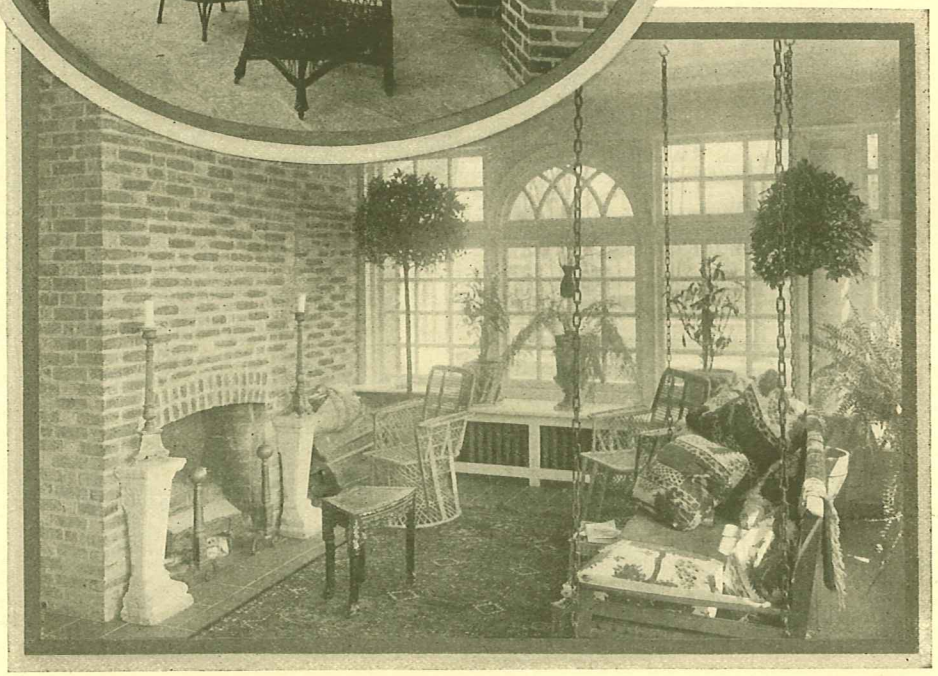
Common Brick Fits the Formal Picture



An inviting nook with brick hearth



Brick ideal for the porch



And for the sun porch

Simple, sound in design and withal sympathetic

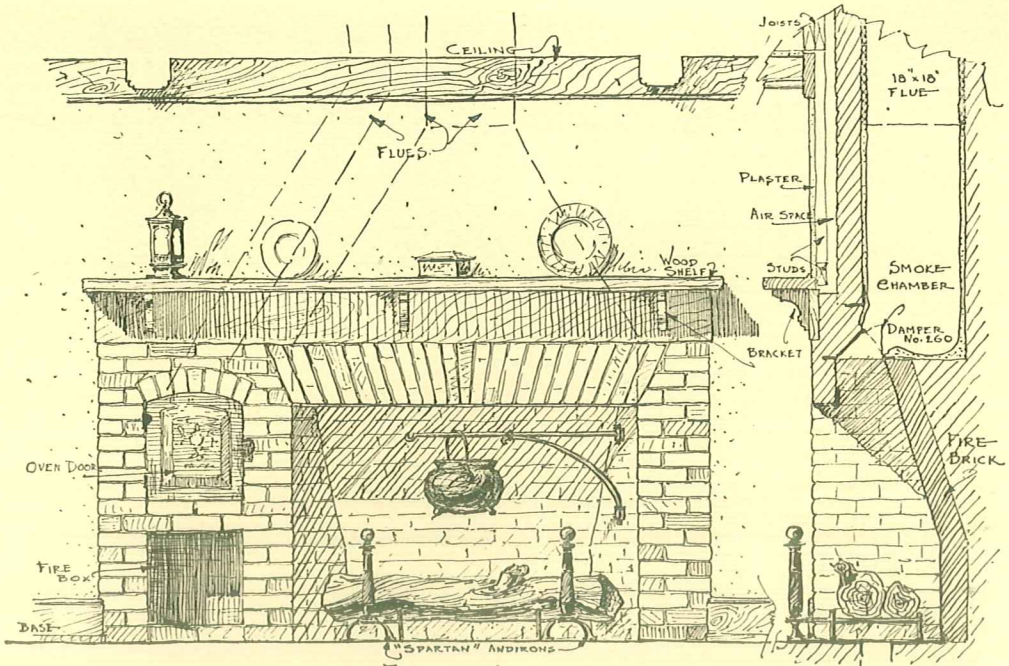
The side-wall masses enhance the dignity

For the corner, in the Spanish style

As Colonial as one could wish

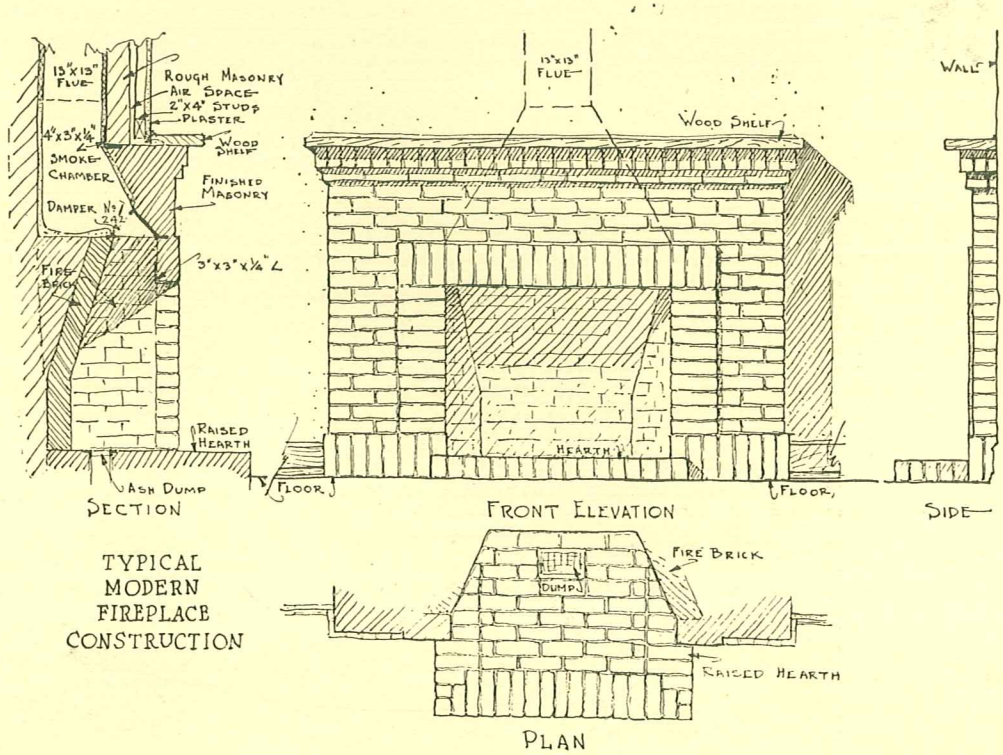
Conventional and Beautiful

Bizarre but interesting and attractive

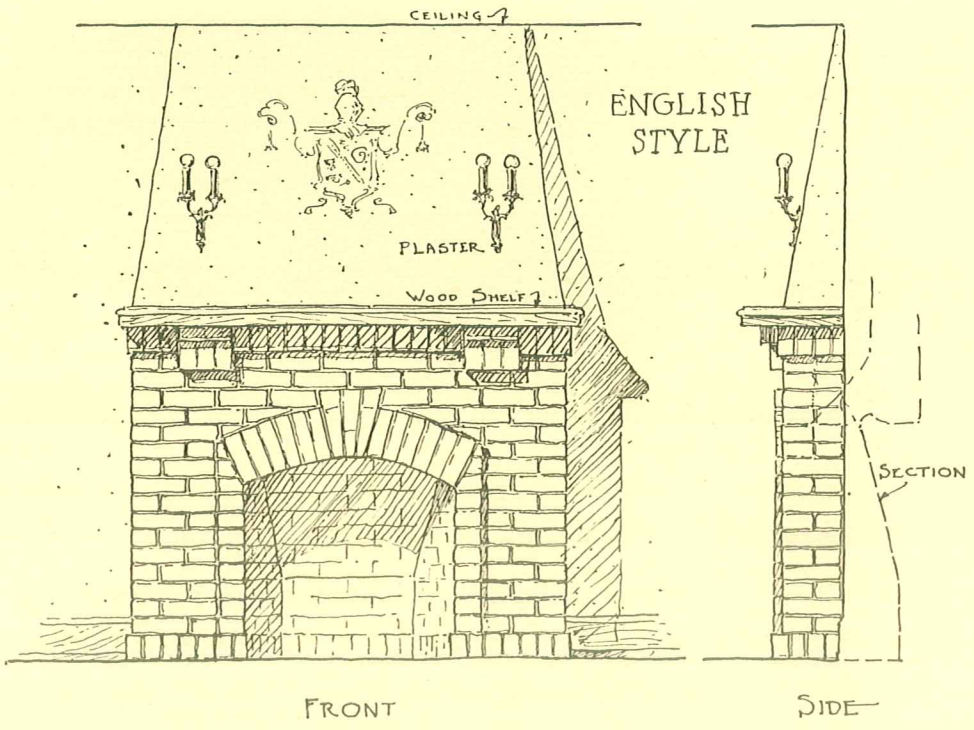


MODERN CONSTRUCTION APPLIED TO EARLY AMERICAN MANTEL - FACE FLUSH

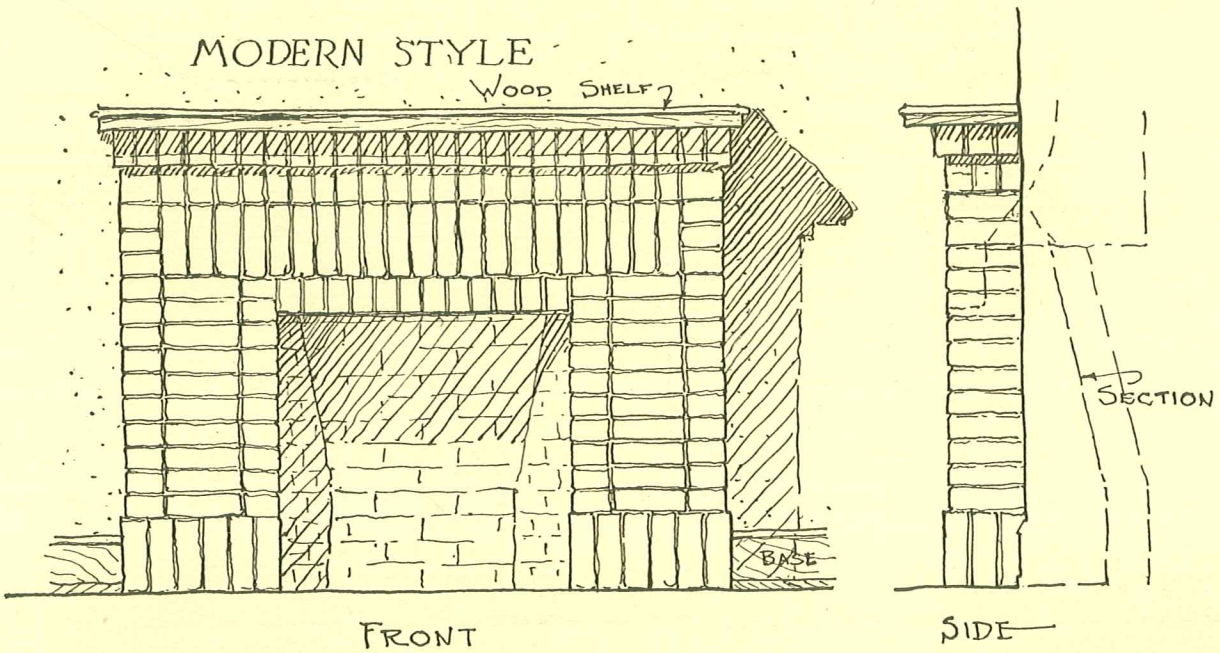
Design by courtesy of The Donley Brothers Co.



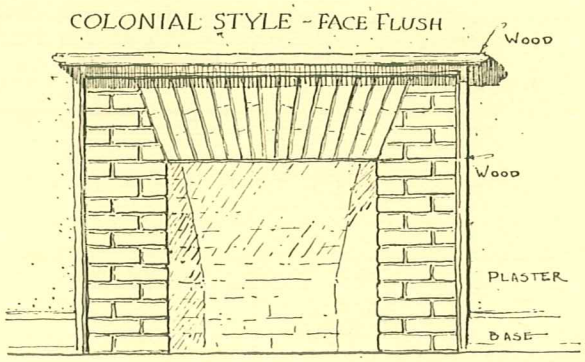
Design by courtesy of The Donley Brothers Co.



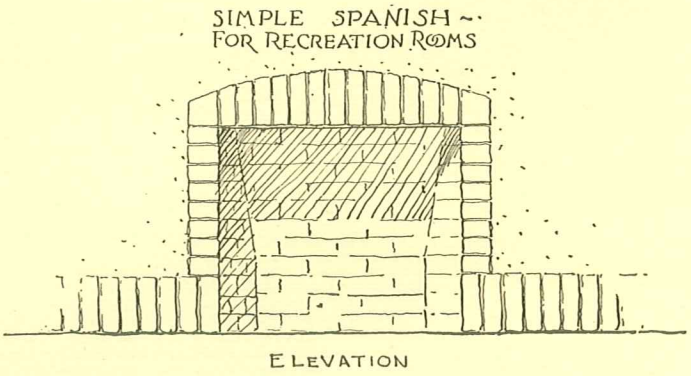
Design by courtesy of The Donley Brothers Co.



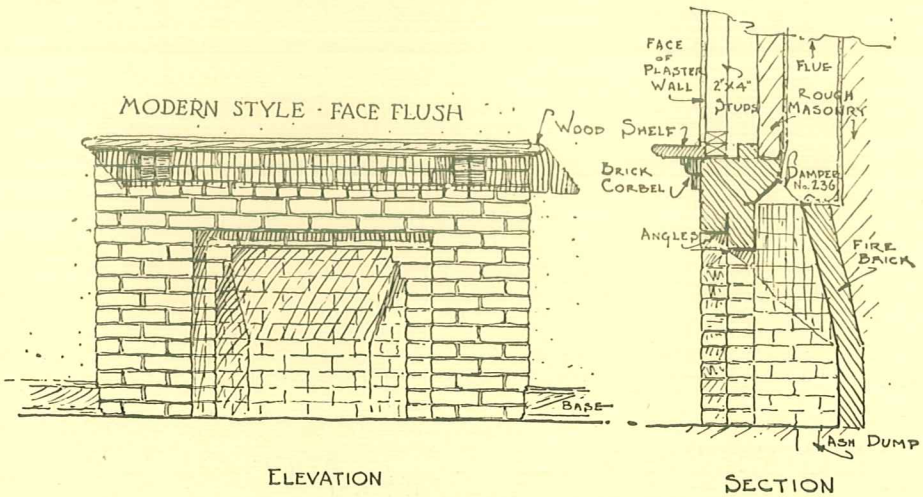
Design by courtesy of The Donley Brothers Co.



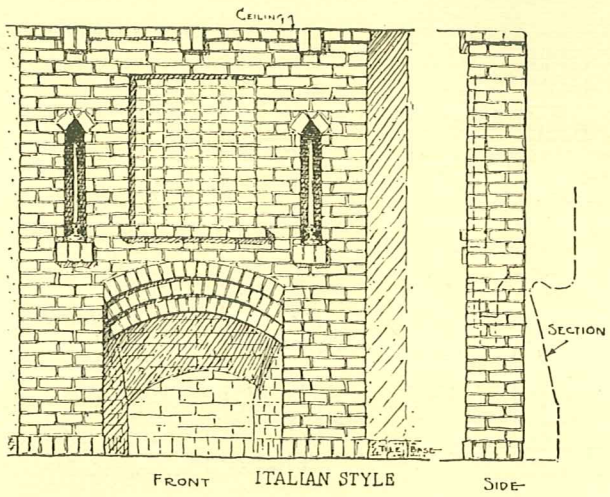
Design by courtesy of The Donley Brothers Co.



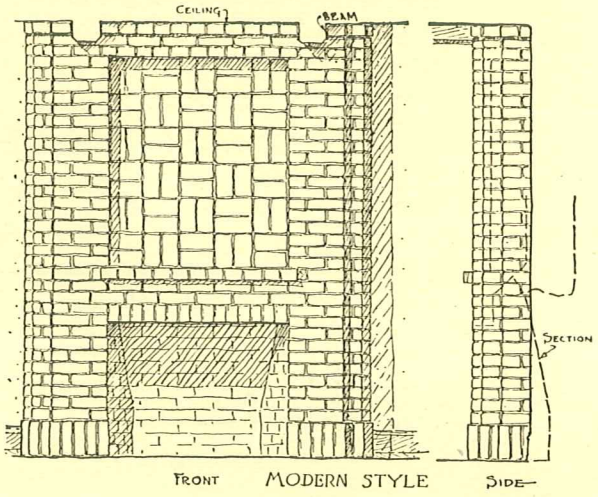
Design by courtesy of The Donley Brothers Co.



Design by courtesy of The Donley Brothers Co.



Design by courtesy of The Donley Brothers Co.



Design by courtesy of The Donley Brothers Co.

Fireplace and Chimney Construction

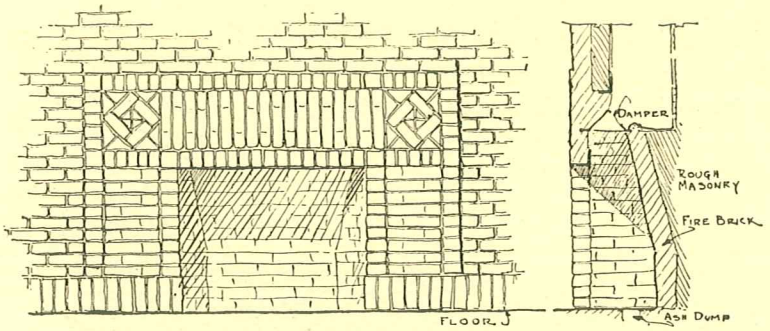
The art of building a fireplace so that it will perform properly and satisfactorily is often more or less of a mystery to the home owner and even to many brick masons. Building a fireplace which does not deliver smoke into the room as well as up the chimney and which gives out a fair measure of heat in return for the fuel fed has been considered as much a matter of good luck as of good management.

This older prevailing impression is far from being a correct one, for there is nothing mysterious about the design or construction of a thoroughly satisfactory fireplace. On the contrary, the principles upon which good fireplace design are based are but few, are simple and easily understood and if applied in the construction of any fireplace will insure satisfactory results.

These few essentials of correct design have only to do with proper combustion and heat radiation, so that fireplaces need not be alike in exterior design or ornamentation. They may, indeed, be of almost any design and still function properly if combustion chambers and flues are of correct proportions.

The proper method of constructing both fireplace and chimney are discussed herewith.

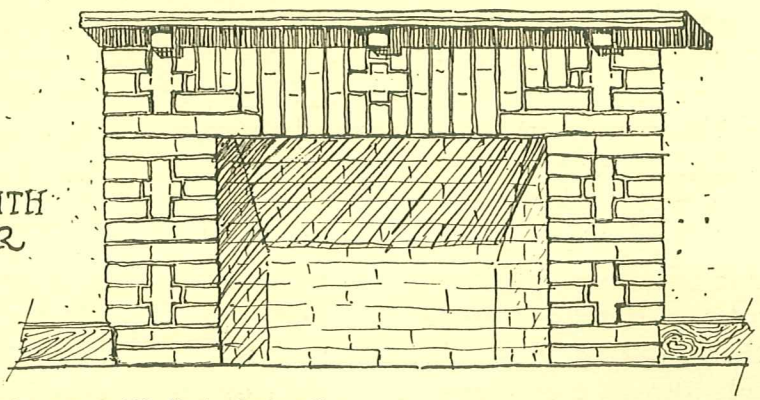
FLUSH FIREPLACE IN A BRICK WALL



This design is well adapted to either interior or exterior brick wall face.

Flush designs preserve full floor areas.

MODERN STYLE FLUSH WITH PLASTER



Designs by courtesy of The Donley Brothers Co.

Essential Requirements

The essential objects to be attained are:

1. Proper combustion of the fuel.
2. Delivery of all smoke and other products of combustion up the chimney.
3. Radiation of the maximum amount of heat to the room.
4. Simplicity and fire-safeness in construction.

The first two essentials are closely related and depend mainly upon:

1. Shape and relative dimensions of combustion chamber.
2. Ratio of flue area to fireplace opening.
3. Proper location of fireplace throat and smoke shelf.

The amount of heat radiated also depends upon the shape and relative dimensions of the combustion chamber.

Size of Fireplace

But the first consideration is the choice of a proper size for the room in which it is located.

One may have been charmed by an immense fireplace in some quaint Colonial home and be led into the error of building a fireplace entirely out of proportion to the size of one's own room. A fire that would fill such a fireplace would be entirely too hot for a moderate-sized room. Moreover, it would require a larger chimney and would induce an abnormal infiltration of air through doors, windows, crevices, etc., to supply the needs for combustion and so waste fuel. Keep this in mind and select a size suitable to the room. A living room with 300 square feet of floor space is well served by a fireplace opening 30 to 36 inches wide. Fireplaces of 42, 48, 54 and 60-inch widths should only be used in rooms of correspondingly greater size.

Location of Fireplace

The location of the fireplace in the room is also an important consideration. Since it is perhaps the most ornamental feature inside the house, it should be given a prominent position. But it should not, if avoidable, be in the line of travel through the room, nor near the entrance door, nor where a cross draft sweeps it. If placed in the longer side of the room, it should not be built out so far as to cut down the useful width of the room or cause a floor rug or other covering to overlay the hearth. If built into an outer wall, the same caution holds. Keep in mind also that when large windows flank the fireplace, people face too much light when the fireplace is used during the day. It is better to use small windows placed high in the side wall. An outside end wall is a favorite and well-chosen location. The full floor space of the room may be preserved by building the back of the fireplace and chimney projecting out from the side wall. This often improves the exterior appearance of the entire side of the house.

Proper Proportions of Fireplace Opening

Fireplace openings should not be too high. Regardless of the width, the height of the opening is usually made from 30 to 34 inches above the hearth, principally because of flame height and also with a view to proper mantel height. It would be a mistake to simply increase the dimensions on the plan of a small fireplace and expect the larger one built therefrom to be satisfactory. The table below gives a combination of openings, depths and corresponding flue lining sizes which are known to work well. The depth is often determined by wall depth or by the permissible projection into the room. A shallow opening throws out more heat. There is no particular advantage in a deep fireplace and there are often disadvantages.

Flue Areas, Relative to Fireplace Openings

Relatively high velocities through the throat and flue are desirable, for they induce the adjacent air and smoke into the stream and so prevent smoke from coming into the room.

Both the height of the chimney and the area of the flue affect the velocity. For the average two-story dwelling, the flue area should be about one-tenth of the area of the fireplace opening; some authorities use one-twelfth. For a chimney 30 feet or more high, one-twelfth should be ample, but for chimneys of bungalows or where the chimney height is 20 feet or less, one-tenth of the area is safer. But the full area of *circular* flues only is effective. The corners of square and oblong flues are practically dead spaces. Therefore the *effective* areas are less than the geometric area and effective areas should always be used in calculations. The effective areas of various shaped flue linings of commercial sizes are given in the following table. Since the effective flue area may seldom equal exactly one-tenth or one-twelfth of the fireplace opening, use the lining which in effective area is next above the calculated area. However, a few square inches less in area will make no essential difference.

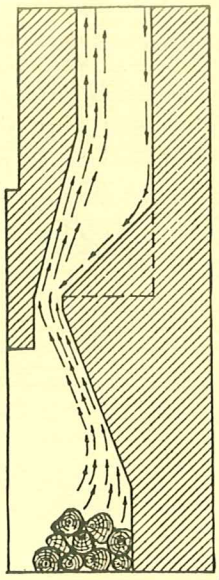
Table of Fireplace Dimensions

Width of Opening Inches	*Approximate Height Inches*	*Depth of Opening Inches*	*Rectangular Outside Dimensions Inches*	*Nominal Flue Sizes*		
				Effective Area	*Circular Inches*	*Effective Area*
24	28	17—20	8½x8½	41 sq. in.	10 dia.	78 sq. in.
28	28	17—20	8½x13	70 sq. in.	10 dia.	78 sq. in.
30	30	17—21	8½x13	70 sq. in.	12 dia.	113 sq. in.
34	30	17—21	8½x13	70 sq. in.	12 dia.	113 sq. in.
36	30	21	8½x18	97 sq. in.	12 dia.	113 sq. in.
40	30	21—24	8½x18	97 sq. in.	15 dia.	177 sq. in.
42	30	21—25	8½x18	97 sq. in.	15 dia.	177 sq. in.
48	32	21—26	13x 13	100 sq. in.	15 dia.	177 sq. in.

Proper Shape of Combustion Chamber

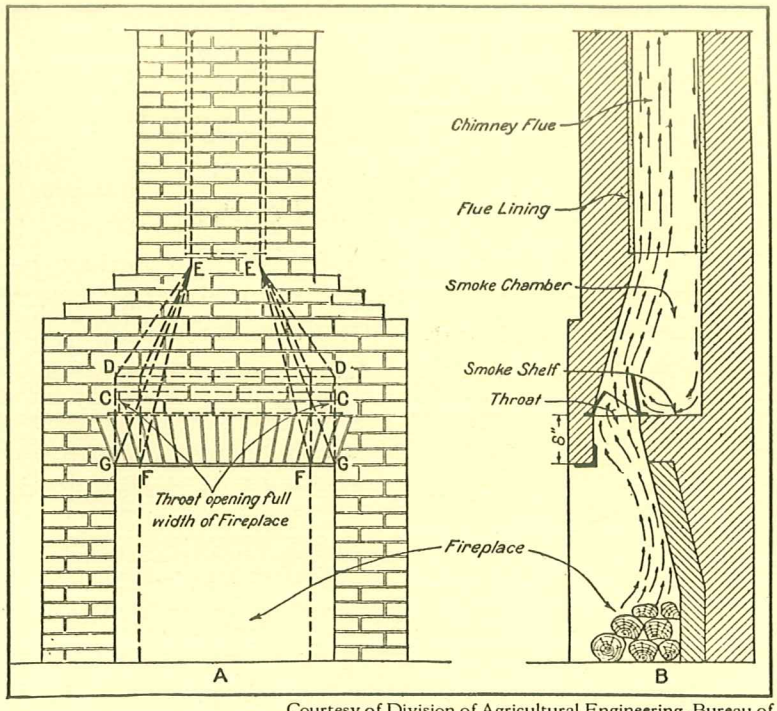
The shape of the combustion chamber influences both the draft and the heat radiated to the room. For good draft the upper part on all sides should slope in gently to the size of the throat. This slope should preferably be not greater than about 30 degrees from the vertical, a ratio of approximately 3 inches horizontal to 5 inches vertical. The slope usually starts from a point a little less than half way from the hearth to the throat. This slope of the sides and the back to the long, narrow throat, throws the flame forward and leads the gases with increasing velocity through the throat.

For maximum heat radiation, the sides are not only sloped in toward the center, but they are also splayed toward the back. The amount of splay which gives maximum radiation has been, by years of experience, fixed at approximately 5 inches for each 12 inches of depth.



Courtesy of Division of Agricultural Engineering, Bureau of Public Roads, U. S. Department of Agriculture.

This construction without a throat damper or smoke shelf is bad. It directs the down draft so that it meets the up draft almost at the throat.



Courtesy of Division of Agricultural Engineering, Bureau of Public Roads, U. S. Department of Agriculture.

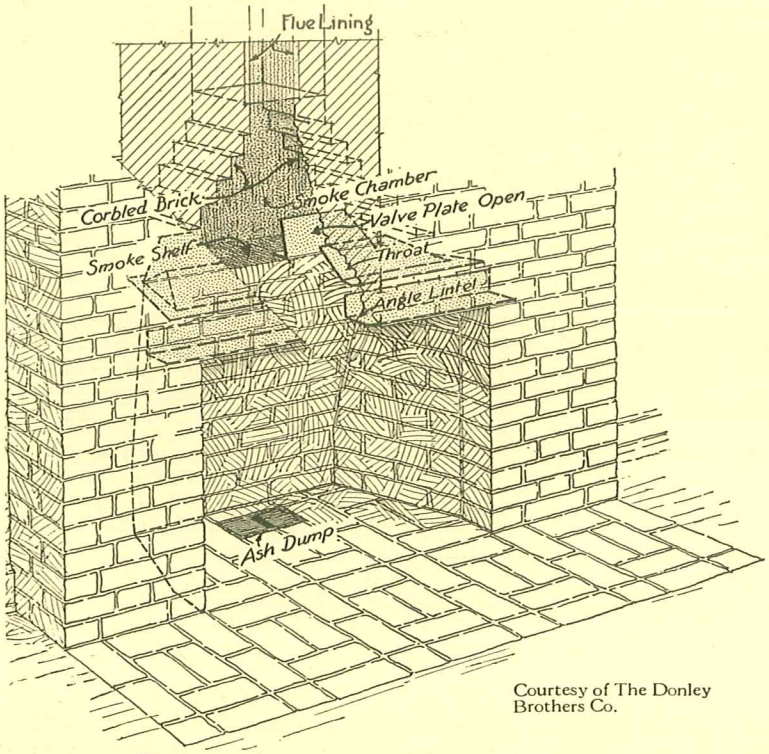
A. Top of throat damper is at DD, smoke shelf at CC. Side-wall should not be drawn in until the height DD is passed. This assures full area. If the drawing in is done as indicated by lines EF and EG, the width of the throat becomes less than the width of the opening and causes the air currents to pile up in the corners of the throat, resulting frequently in a smoky fireplace. B. Shows one method of placing throat damper which is more difficult of operation. Logs should be elevated above hearth.

Importance and Location of Smoke Shelf

A good draft depends not only upon the proper relation of fireplace opening to the flue size, but upon the location of the throat which in turn determines the position of the smoke shelf. The slope of the back and sides terminates in the throat which is usually formed of a combination metal throat and damper. It is best to place a damper in the throat in any case. The throat should be not less than four inches above the top of the fireplace opening, eight inches is much better. The illustrations show this construction better than a verbal description.

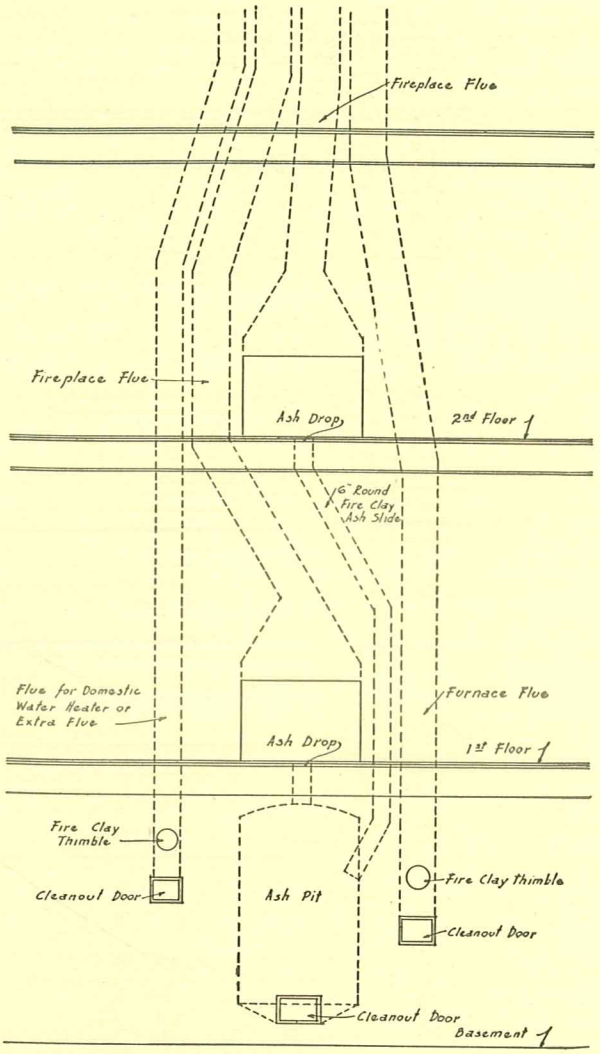
The space above the throat and smoke shelf is the smoke chamber and this is again gently sloped inward to the size of the flue lining, from which place the flue lining starts.

The smoke shelf has an important duty. The usual cause of smoke being discharged into the room is down drafts in the chimney. The smoke shelf, located above the upper fireplace opening, deflects the down draft upward into the rising column of gases and so prevents its escape into the room.

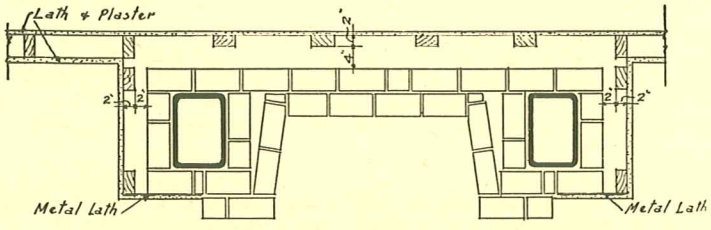


Courtesy of The Donley Brothers Co.

Perspective showing principal features of construction

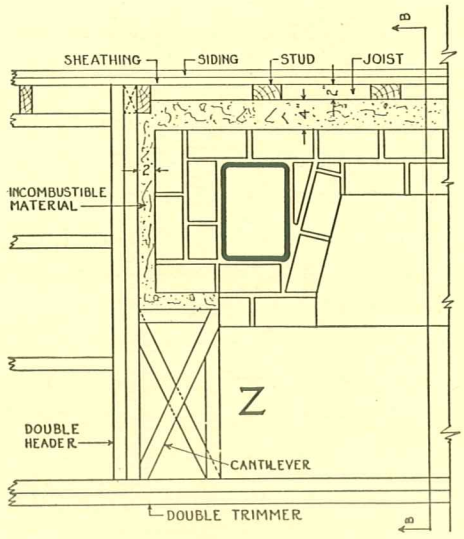


Illustrating arrangement of flues for two fireplaces, furnace and domestic water heater or extra flue. Also shows ash slide from fireplace on second floor.



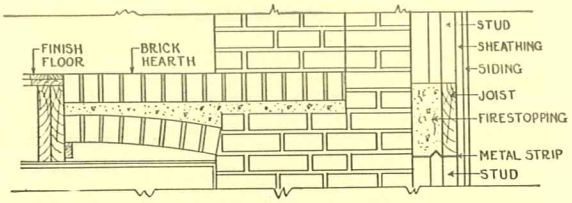
Redrawn from standard of National Board of Fire Underwriters

Stud partition across back of fireplace and around the ends of the chimney breast, showing proper arrangement of studs.



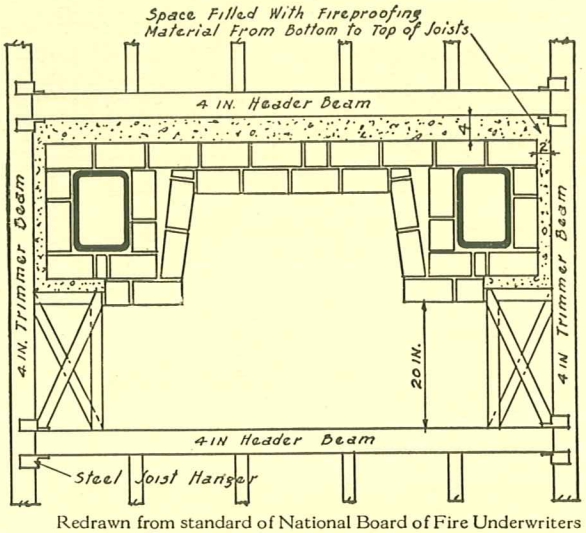
PLAN

Protection around fireplace in outside frame wall.



SECTION B-B

Brick trimmer arch supporting front hearth.

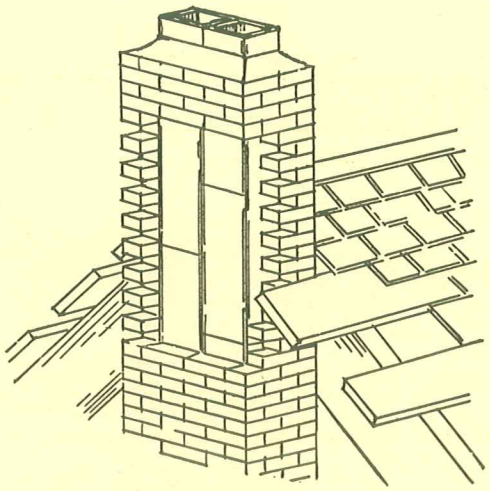

Space Filled With Fireproofing Material From Bottom To Top of Joists
4 IN. Header Beam
4 IN. Trimmer Beam
4 IN. Trimmer Beam
20 IN.
4 IN Header Beam
Steel Joist Hanger

Redrawn from standard of National Board of Fire Underwriters

Floor framing around a single fireplace. Note filling between framing and brickwork, which serves both as insulator and fire-stop.

Metal Throats and Dampers

As previously stated, a combined throat and damper of metal is used in most cases. It forms a smooth throat passage and simplifies the mason's work. Some metal throats are built with a broad flange at the base which becomes the supporting lintel for the brickwork above. In other cases, a steel angle forms the support, except where a brick arch is used. A damper for controlling the draft is essential and it further serves to close off the flue when the fireplace is not in use.



Chimneys are frequently built with stacks of flue lining together. Joints should be offset at least seven inches. The method shown below is better.

Methods of Construction

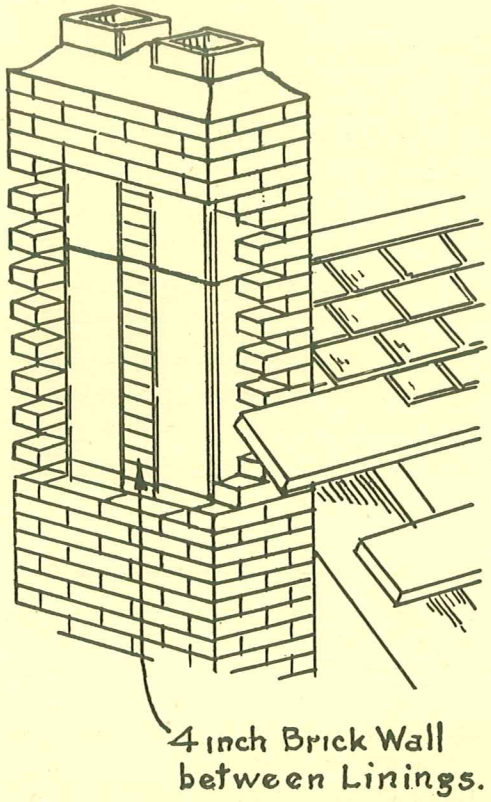
The construction of the brickwork comprising the fireplace and chimney is usually one continuous operation. The same chimney often contains other than the fireplace flue and is an integral piece of brick masonry from the foundation footing to the chimney top.

The general design and the special features are easily seen and understood from the illustrations. It is only necessary to add a few words of caution and suggestion.

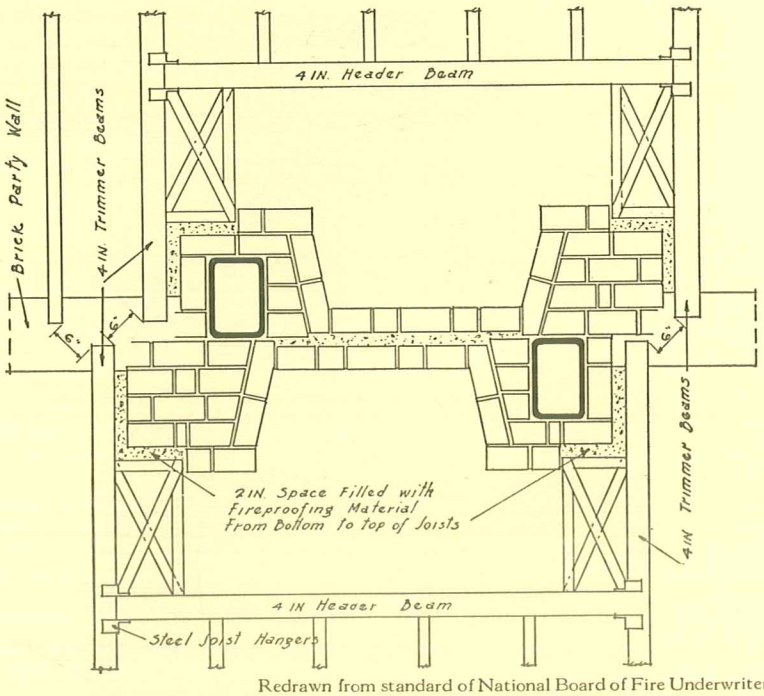
To prevent the finished mantel and hearth from being spotted with plaster, build all the rough brickwork first.

Every fireplace and every other stove, furnace or what not should have a separate flue carried to the top of the chimney, with no other connections.

Not more than two flues should be in the same chimney space. Where there are more than two flues, each third flue should be separated from the others by a "withe" or 4-inch brick partition.



Proper method of building chimney with two flues, both lined with flue lining and separated by a "withe" or division wall.



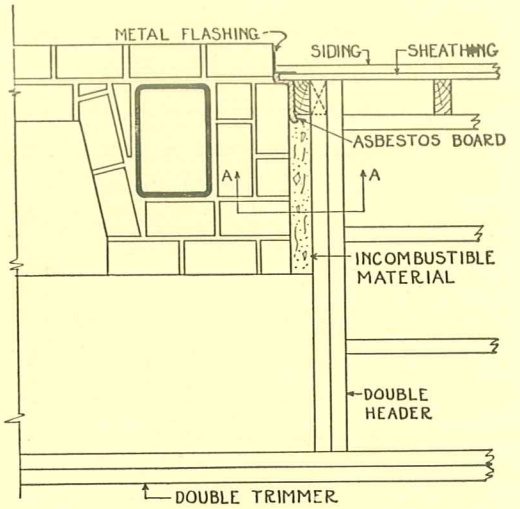
Redrawn from standard of National Board of Fire Underwriters

Method of building two fireplaces back-to-back in a brick party wall to secure proper spacing between ends of floor joists.

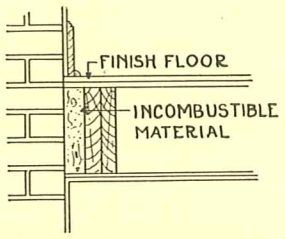
The least expensive way to build the chimney above the fireplace is to make the walls 4 inches thick, lined with burned clay flue lining. With walls of this thickness never omit the lining or replace it with plaster. The expansion and contraction of the chimney would cause the plaster to crack and form an opening from the interior of the flue through which flame could pass. See that all joints are completely filled with mortar.

The flue lining should be built in as the chimney goes up and the space between flues and brickwork well filled with mortar. Each flue section should be well bedded in mortar. Set the flue sections first and build the brickwork around them. Don't build the brick chimney and then attempt to insert the flue lining, for a good job is impossible and this practice should not be allowed.

Carry the chimney up to a point at least one foot above the highest point of the roof. Wind curling over the roof top will not then cause a down draft in the chimney. The preferred finish is a slab of natural stone or of masonry, supported high enough above the chimney top to make each side opening equal to or greater than the total flue areas. Ornamental chimney pots are also much used. Their slightly contracted area helps to prevent down drafts.



PLAN



SECTION A-A

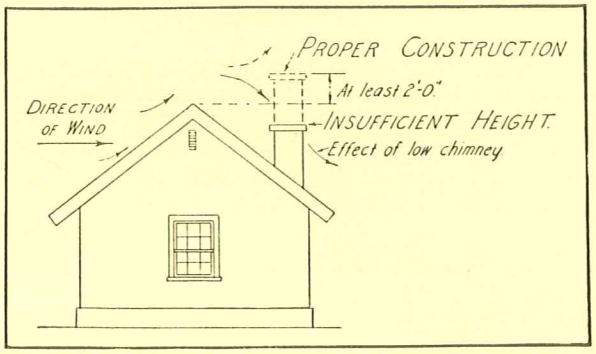
Protection around fireplace extending through outside wall.

The fireplace flue should start from the middle top of the smoke chamber and not from the side. If it is necessary to offset it, start the slope to the offset from the middle as shown in the illustration. The sloped portion should not be inclined more than 30 degrees from the vertical (3 inches horizontal to 5 inches vertical) otherwise soot may accumulate and decrease the draft.

The adjacent ends of both flue lining sections must be mitered off to make the angle joint, if the full area of the flue is to be preserved at this point.

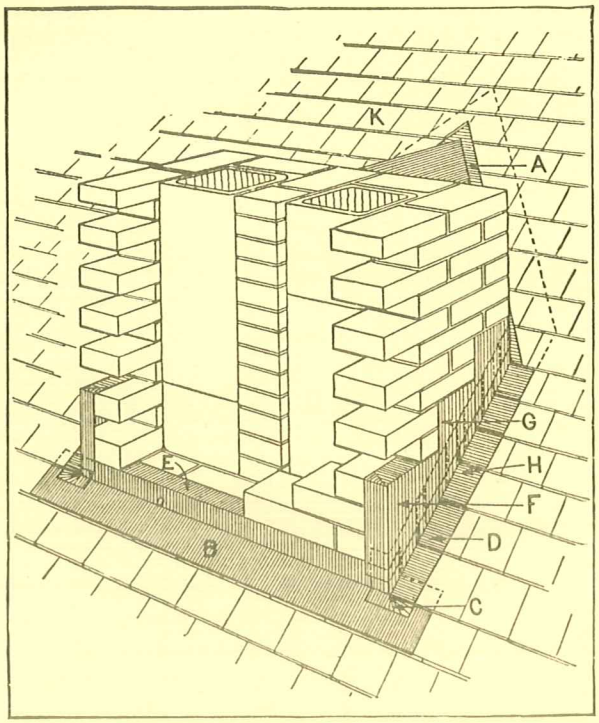
It should be unnecessary to say that the front hearth, as well as the back hearth, should be of masonry, and it should always be supported by a brick "trimmer" arch, as shown, or by a reinforced concrete slab or by metal; never by wood.

An ash trap door in the back hearth with an ash chute and clean-out door at the bottom of the chimney in the basement, is preferred construction and most always used.



Courtesy of Division of Agricultural Engineering, Bureau of Public Roads, U. S. Department of Agriculture.

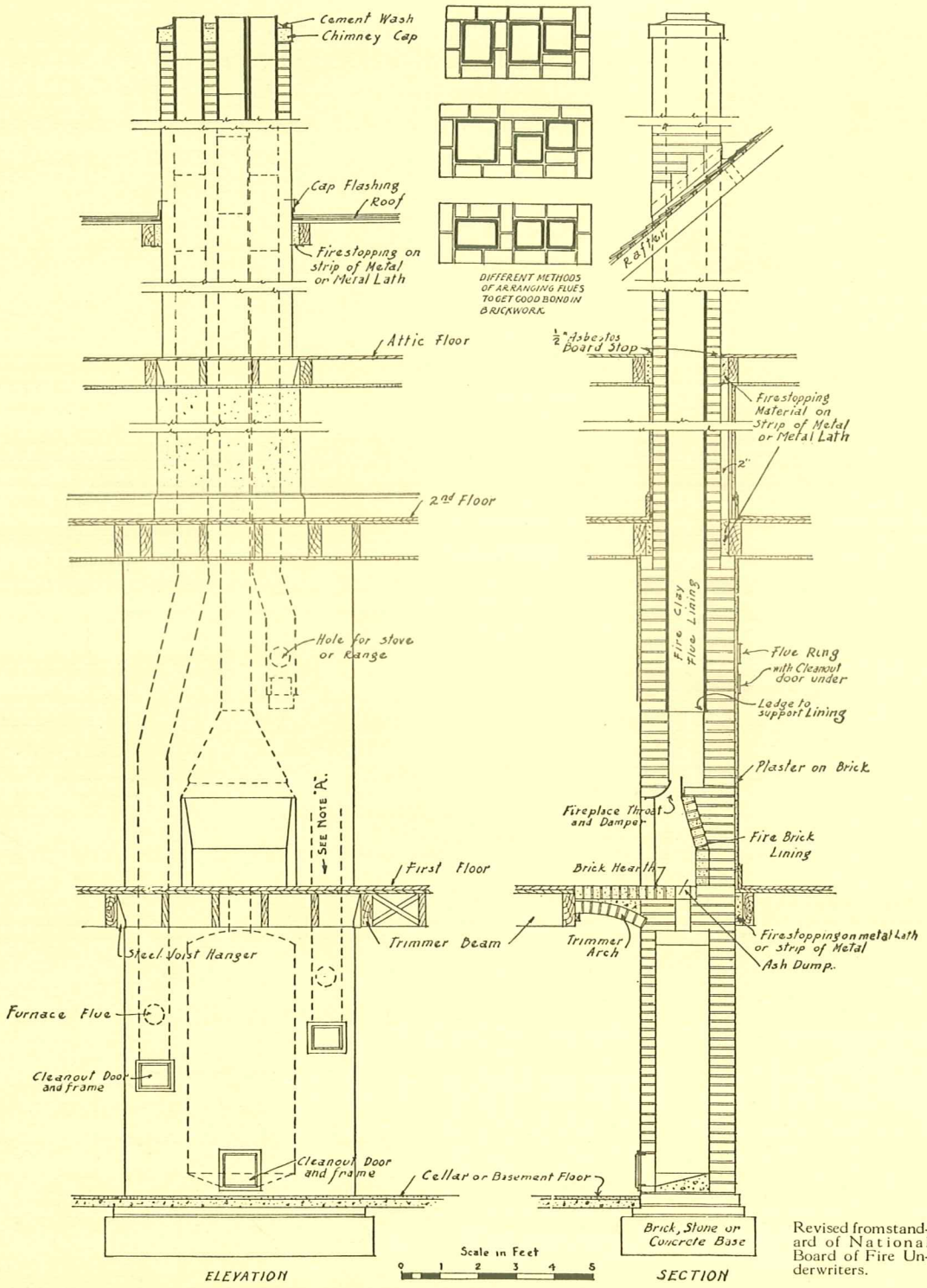
Top of chimney should be at least two feet above the top of the ridge in order that wind currents may not be deflected down the chimney.



Courtesy of Division of Agricultural Engineering, Bureau of Public Roads, U. S. Department of Agriculture.

Chimney and Roof Connection. Sheet metal A should have roofing units K over it at least four inches. Apron B bent as at E with base flashings C, D, and H and cap flashings F and G, lapping over the base flashings provide watertight construction. When the chimney contains two flues the joints should be separated as shown.

The proper construction of fireplaces and chimneys to make them firesafe is more fully described in the ordinance for chimney construction published by the National Board of Fire Underwriters and distributed gratis by them. Their main office is at 85 John Street, New York City, but most local insurance offices have copies of this ordinance.



Revised fromstandard of National Board of Fire Underwriters.

Elevation and section of an interior independent chimney showing recommended construction.

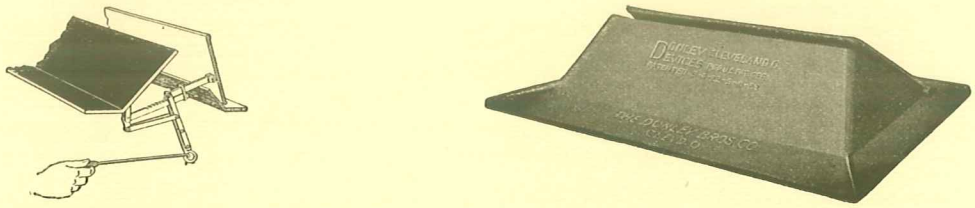
It is recommended that an extra flue always be built in a chimney breast. The masonry displaced from the chimney breast will practically pay for the cost of lining and the only additional cost will be for the lining and brickwork for three additional four-inch walls surrounding it in the chimney itself. Such a flue will be found invaluable for domestic hot water heater, laundry stove or other appliances not perhaps originally contemplated.

Fireplace Equipment

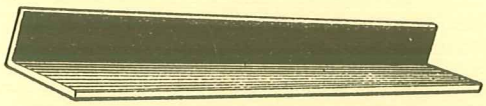
There are certain metal fixtures and equipment which can be had which make fireplace construction simpler and slightly less expensive and which go far toward making its operation positive and satisfactory and its care less troublesome. Some of these are: the combination throat and damper (previously mentioned), the ash trap door and the clean-out door and frame.

For the fireplace itself, there is a variety of such beautiful and ornamental metal fixtures as andirons and fuel baskets, fire tools and their holders and wood and fuel baskets and hods. Through the courtesy of The Donley Brothers Co., Cleveland, Ohio, some examples are illustrated herewith.

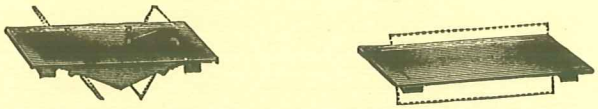
Fireplace Damper



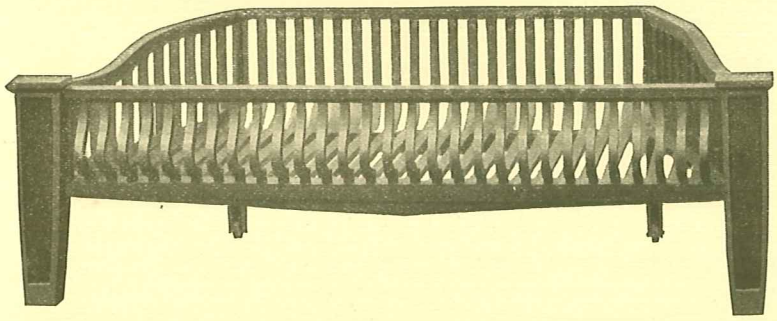
Fireplace Damper, Poker Control



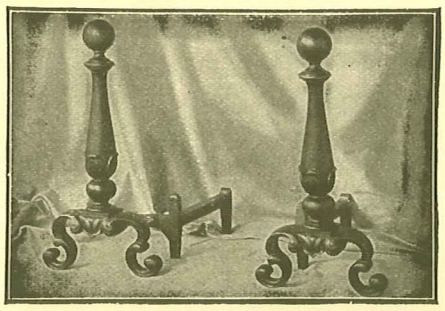
Steel Angle



Ash Dumps



Fire Basket



Andirons

Courtesy of The Donley Brothers Co.

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